# Winter 2016-2017 in Review

With March 1 comes the end of meteorological winter, a period defined as covering the months of December through February. The winter of 2016-17 was the second consecutive warm winter in a row, matching winter 2011-12 as one of the warmest winters experienced since 2000. Central Indiana experienced one of the warmest Februarys on record with many locations 10 to 13 degrees above normal for the month, highlighted by highs surging into the middle 70s in many areas ahead of a cold front on February 24.

While the winter was active and stormy at times, the precipitation type was primarily in the form of rain or a wintry mix through December, January and February. Snow was well below normal throughout the winter, with less than 10 inches of snow over all of central Indiana through January and February. Indianapolis saw less than 4 inches of snow after January 1.

The following is a review of weather conditions experienced in central Indiana during the winter season of 2016-2017.

## *Temperatures*

**DECEMBER**

Temperatures started out December relatively close to normal as highs in the upper 30s and lower 40s were common with lows predominantly in the 30s. The initial shot of colder air for the month arrived late on the 7th, with multiple days with highs mainly in the 20s through the 10th. Temperatures recovered back close to normal from the 11th through the 13th as highs recovered largely into the mid and upper 30s.

The bottom fell out beginning late on the 13th as very cold arctic air overspread the region in the wake of a frontal passage. With a few inches of fresh snow on the ground for most as well, temperatures tumbled into the single digits and low teens by the morning of the 14th. This started a week long stretch where temperatures largely remained subfreezing across central Indiana, highlighted by highs only from 10 to 15 degrees on the 15th. The only exception took place on the 17th as a frontal boundary became nearly stationary over south central Indiana. While temperatures remained in the 30s to the north, highs briefly surged into the 50s from Washington to Seymour and North Vernon. Subzero lows were common across much of central Indiana on the 18th and 19th as well. For Indianapolis, the low of -1° on the 19th marked the first subzero low in December since Christmas Day 2004.

Beginning on the 20th, a warmer airmass overspread the Ohio Valley, with above normal conditions continuing for the rest of the month. Highs were largely above 40° through the period, with a very warm Boxing Day as highs surged into the 60s ahead of a cold front on the afternoon of the 26th. The month and year ended on a mild note as highs rose into the middle and upper 40s on the last day of 2016.

Temperatures averaged up to 2° below normal across central Indiana for the month. For many locations, this was the first month with below normal temperature averages since May.

**JANUARY**

2017 began on a mild note across central Indiana as highs peaked on the 2nd and 3rd in the lower 50s. The warmup was short-lived however, as much colder, Arctic air spilled into the region in the wake of a strong low pressure. The following five days would end up bringing the coldest temperatures of the entire month as highs remained in the teens for multiple days. A few locations across northern portions of central Indiana stayed in the single digits on the 6th. Lows fell just below zero in many areas on the morning of the 7th as the core of the Arctic airmass moved across the Ohio Valley.

Temperatures recovered rather rapidly into the second week of the month with highs peaking in the 60s on the 11th and 12th before returning back to near freezing through the middle of the month. The overall mild pattern continued for the second half of January with no substantial stretch of very cold air. Highs from near 50 into the 60s were common from the 19th through the 25th, highlighted by highs peaking in the mid 60s on the afternoon of the 21st as the sun made a rare appearance in what had otherwise been a cloudy month. Temperatures fell back into the lower and mid 30s over much of central Indiana for the last several days of the month, colder weather than had been experienced over the previous two weeks but hardly out of the norm for late January.

The overall mild weather experienced through much of the month brought average temperatures for January at 6 to 8 degrees above normal. For many locations, this January was the warmest since January 2006. Indianapolis enjoyed four days at or above 60 during the month, the first time that many days had made it to 60 degrees during the month of January since 1974.

**FEBRUARY**

A February that saw temperatures 10 to 13 degrees above normal on average across central Indiana started out on the cooler side, as highs the first four days of the month largely remained below 40 degrees. Many locations experienced their coldest morning of the month on the 4th in the lower teens. Temperatures warmed over the following few days, peaking in the upper 50s and lower 60s on the 7th, before much colder air briefly returned late on the 8th and into the 9th in the wake of an upper level wave that brought the only snowfall most saw during the month. The 9th was the coldest day for many as highs struggled to get any higher than the mid to upper 20s.

A return to southerly flow brought a rapid return to above normal temperatures with highs climbing into the 60s on the 11th and 12th. After another cooldown that would last through the 16th, an extended period of well above normal temperatures with daily highs above 60 would begin on the 17th and last for eight days. This period of unusually warm weather would establish new records at Indianapolis for the number of days at or above 60 in February, and number of consecutive days at or above 60 in February. The warm stretch would be highlighted by highs rising into the 70s on the 23rd and 24th ahead of a strong cold front. Much of central Indiana made it into the mid 70s on the afternoon of the 24th, including a high of 74 in Indianapolis which ended up not only being the warmest February day in 17 years, but just missed the all-time February record high of 76 as well.

The passage of the front late on the 24th brought an abrupt end to the early season warmth, with temperatures the following day 40-45 degrees colder. The cooler weather was again short lived as a return to southerly flow ahead of another strong storm system brought temperatures into the 60s again during the evening of the 28th.

The average temperature of 43.3 degrees at Indianapolis during the month of February broke a 135 year old record, besting the previous record warm February in 1882 by nearly a degree. 11 of the 28 days saw temperatures rise above 60 degrees, 10 of those days at or above 65 degrees. In fact, February 2017 saw almost as many 65 degree or warmer days in Indianapolis as had been experienced in February since 2000.

## *Temperature Data for Sites in Central Indiana*

| Site | Winter 2016-17 Temperature | Normal Temperature | Diff. From Normal |
|---|---|---|---|
| Indianapolis Int'l Airport | 36.0 | 30.5 | **+5.5** |
| Lafayette | 33.4 | 29.1 | **+4.3** |
| Muncie | 36.2 | 28.9 | **+7.3** |
| Terre Haute | 36.0 | 30.7 | **+5.3** |
| Bloomington | 37.1 | 31.5 | **+5.6** |
| Shelbyville | 37.2 | 30.7 | **+6.5** |
| Indianapolis – Eagle Creek | 36.4 | 30.6 | **+5.8** |

## *Winter Extremes Across Central Indiana*

| Site | Warmest Temperature | Coldest Temperature |
|---|---|---|
| Indianapolis Int'l Airport | 74 on 2/24 | -1 on 12/19 and 1/7 |
| Lafayette | 68 on 2/20 | -6 on 12/19 |
| Muncie | 73 on 2/24 | -1 on 1/7 |
| Terre Haute | 72 on 2/23 | -1 on 1/7 |
| Bloomington | 74 on 2/24 | -5 on 1/7 |
| Shelbyville | 78 on 2/24 | -2 on 12/14 |
| Indianapolis-Eagle Creek | 72 on 2/24 | -1 on 12/19 |

## *Precipitation*

**DECEMBER**
December melted precipitation was near normal to below normal for almost all of Indiana. Only some lake effect areas in northern Indiana and near the Ohio River in extreme south central and southeast Indiana received above normal precipitation during the month.

Melted precipitation ranged from less than 1 inch in a few areas of west central and north central Indiana to more than 6 inches on the Ohio River in south central Indiana. Much of the state received 1 to 3 inches.

River flooding returned to portions of central Indiana for the first time since September. Brief lowland flooding occurred near the end of the month along portions of the Wabash River in the Lafayette, Covington and Montezuma areas of west central Indiana

Drought conditions improved during the month. The percentage of the state in drought decreased from 75% at the beginning of December to 25% at the end of the year. Portions of west central, north central, eastern and southern Indiana remained abnormally dry.

The first significant snow of the winter season fell in central and northern Indiana during December. Monthly snowfall ranged from a trace in southern Indiana to over 28 inches near Lake Michigan in northern Indiana. Much of central Indiana received between 2 and 6 inches while northern Indiana totaled 6 to 24 inches, with some of the highest amounts downwind of Lake Michigan and courtesy of heavy lake effect snow. Southern Indiana received a trace to less than 2 inches. Monthly snowfall was normal to above normal in northern Indiana, near normal in central Indiana and below normal in southern Indiana. Indianapolis received 4.9" of snow in December, 2" below the average for the month. Most of the snow fell on the morning of the 13$^{th}$ as a quick moving storm system deposited 3 to 4 inches of snow along the Interstate 70 corridor.

**JANUARY**
January melted precipitation was normal to above normal for the entire state except for southwest Indiana. Melted precipitation ranged from near 2 inches in southwest Indiana to nearly 6 inches in portions of northeast and isolated areas of central Indiana. Much of the state received 3 to 5 inches during the month. The wet pattern of January ended the areas of drought that began in October.

A prolonged wet spell began in Indiana on the 10th and continued through the 20th. Much of the state received 2 to more than 4 inches during this time. The heaviest rain during this period fell on the night of the 19th when much of the area received 1 to 2 inches.

Widespread lowland river flooding quickly followed in central and southern Indiana on the 20th and 21st. This was the most extensive flood event in a year. Flooding lasted from a few days in central Indiana to nearly 2 weeks in southwest Indiana.

Because of the warm weather that prevailed for much of January, snowfall was below normal for the entire state. Monthly totals ranged from a trace in southwest Indiana to more than 12 inches in northern Indiana. Much of the state received less than 3 inches for the month. Indianapolis officially recorded just 1.7 inches of snow for January, the least amount of snow recorded during January since 1998 when just 0.8 inches of snow fell in Indianapolis. Virtually no snow fell in Indiana from the 10th through the 25th.

**FEBRUARY**
February monthly precipitation was below normal to normal for much of Indiana. Portions of northern, south central and southeast Indiana received above normal rainfall as a result of storms on the last day of the month. Melted precipitation ranged from slightly less than an inch in small areas of central Indiana to more than 4 inches in portions of northwest, south central and southeast Indiana. Much of the state received 1 to 3 inches during the month.

A prolonged dry spell began in Indiana on the 10th and continued through the 23rd. Many areas of the state received little or no precipitation during this period. As a result, abnormally dry conditions returned to southwest Indiana by the 21st. Storms on the 24th and 28th alleviated some of the dry conditions that developed during the month.

Rainfall of 1 to 1.5 inches on the 6th and 7th in the upper portions of the Wabash River watershed brought the only high water of the month. River levels along the Wabash River in west central Indiana approached flood stage.

Once again monthly snowfall was below normal for the entire state because of the warm weather that prevailed for most of February. Monthly totals ranged from a few tenths in southern Indiana to 6 inches in east central Indiana. Much of northern and central

Indiana received between 1 and 3 inches during February while southern Indiana received less than one-half of an inch.

## *Winter Precipitation Data for Sites in Central Indiana*

| Site | Winter 2016-17 Precipitation | Normal Precipitation | Diff. From Normal |
|---|---|---|---|
| Indianapolis Int'l Airport | 6.97 | 8.15 | **-1.18** |
| Lafayette | 6.46 | 6.13 | **+0.33** |
| Muncie | 6.90 | 7.42 | **-0.52** |
| Terre Haute | 5.98 | 7.34 | **-1.36** |
| Bloomington | 7.52 | 9.61 | **-2.09** |
| Shelbyville | 7.63 | 8.02 | **-0.39** |
| Indianapolis – Eagle Creek | 6.47 | 7.42 | **-0.95** |

## *Severe Weather*

Strong to severe thunderstorms impacted central Indiana on the late afternoon and evening of January 10th ahead of a cold front. The storms caused numerous trees, limbs and power lines to fall from the strong winds that accompanied the storms. There were also a few reports of small hail.

Strong to severe thunderstorms developed over eastern portions of central Indiana during the late afternoon and early evening of the 24th ahead of a strong cold front. Wind damage and hail up to nickel size occurred over portions of Decatur and Jennings Counties. Strong to severe storms developed over western Indiana late on the evening of the 28th ahead of a powerful cold front, producing hail and strong winds. Storms continued well into the early morning of March 1st. For more information on this event, go to http://www.weather.gov/ind/feb28mar12017severe.

## *Indianapolis Data*

### INDIANAPOLIS DECEMBER 2016 SUMMARY

| | Average Temperature | Total Precipitation | Total Snowfall | Highs below freezing |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| December 2016 | 30.3 | 1.52 | 4.9 | 8 |
| Normal December | 31.6 | 3.17 | 6.9 | 8 |
| Difference from Normal | -1.3 | -1.65 | -2.0 | 0 |

**December 2016 All-Time Ranks:**
**Temperature: 50th Coolest**
**Precipitation: 25th Driest**
**Snowfall: Tied for 58th Snowiest**

## INDIANAPOLIS JANUARY 2017 SUMMARY

| | Average Temperature | Total Precipitation | Total Snowfall | Highs below freezing |
|---|---|---|---|---|
| January 2017 | 34.9 | 4.35 | 1.7 | 4 |
| Normal January | 28.1 | 2.66 | 8.6 | 12 |
| Difference from Normal | +6.8 | +1.69 | -6.9 | -8 |

**January 2017 All-time Ranks**
**Temperature: 16th Warmest**
**Precipitation: 27th Wettest**
**Snowfall: Tied for 28th Least Snowiest**

## INDIANAPOLIS FEBRUARY 2017 SUMMARY

| | Average Temperature | Total Precipitation | Total Snowfall | Highs below freezing |
|---|---|---|---|---|
| February 2017 | 43.3 | 1.10 | 2.1 | 2 |
| Normal February | 32.1 | 2.32 | 6.5 | 7 |
| Difference from Normal | +11.2 | -1.22 | -4.4 | -5 |

**February 2017 All-Time Ranks:**
**Temperature: Warmest**
**Precipitation: 19th Driest**
**Snowfall: Tied for 36th Least Snowiest**

## INDIANAPOLIS 2016-2017 WINTER SEASON SUMMARY

| | Average Temperature | Total Precipitation | Total Snowfall | Highs Below Freezing | Lows Below Zero |
|---|---|---|---|---|---|
| Winter 2016-2017 | 36.0 | 6.97 | 8.7 | 14 | 2 |
| Normal Winter | 30.5 | 8.15 | 22.0 | 27 | 6 |
| Difference from Normal | +5.5 | -1.18 | -13.3 | -13 | -4 |

**Winter 2016-2017 All-Time Ranks**
**Temperature: Tied for 9th Warmest**
**Precipitation: 49th Driest**
**Snowfall: 40th Least Snowiest**

*Temperature and precipitation records at Indianapolis go back to 1871. Snowfall records go back to 1884.*

## *Spring 2017 Outlook*

The official outlook for meteorological spring (March-May 2017) from the Climate Prediction Center indicates a greater chance of above normal temperatures. At Indianapolis, the average temperature for the spring season is 52.6 degrees. The outlook also calls for an equal chance of near, above or below normal precipitation. The average spring season precipitation is 12.42 inches along with 2.8 inches of snowfall, most of which typically falls during the month of March.

***Data prepared by the NWS Indianapolis Forecast Office.***